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A NEW AND EFFECTIVE METHOD

OF TREATING

CONSUMPTION

(PHTHISIS PULMONALIS)

THROUGH ARTIFICIAL CALCIFICATION.

WITH EXPLANATORY CASES AND DRAWINGS.

BY CARL BOTH, M.D.

" . . . . . there is another and quite a cardinal question, the reply to which, in the interest of humanity, should soon be made uniformly certain; namely WHAT IS A TUBERCLE?" — VIRCHOW: *Cellular Pathology* (Berlin, 1862), p. 437.

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PREFACE.

In presenting to the medical world and the American public my theory of the true nature of tubercular lung-disease, as well as my new method for a cure of the same in certain stages in which it is held by most living medical practitioners to be incurable, I consider it important that a proper attention should be paid to what I have to advance; and, to obtain this, it will not be deemed immodest, that I, as a comparative stranger on this continent, should set forth my claims to such attention by mentioning the different stages of preparatory scientific and practical studies through which I passed in the Old World and in the New, before entering upon the task of addressing my readers.

After having finished my collegiate education, at the age of fifteen, I was considered too young for the University. I consequently entered the laboratory of my uncle, A. F. Horn, in Gronau, as his pupil in chemistry, pharmacy, and pharmacology; having at the same time private lessons, with excursions, of the late Dr. Müller, a graduate of Jena, and a pupil of Schleiden, in botany, mineralogy, and geology. In the year 1852, I passed the examination as chemist before Professor Otto and the ducal commission in Braunschweig. The year after, I entered the University of Göttingen, as a medical student. Here Henle, R. Wagner, Foerster, v. Siebold, Fuchs, Baum, Weber, Woehler, and Marx, were my teachers during two years. I then made a voyage to England. On my return, I went, by especial advice of Dr. Stilling, to Würzburg, in preference to Vienna or Berlin. Here I enjoyed the tutorship of Koelliker, Virchow, Scherer, Bamberger, v. Scanzoni, v. Textor, Linhardt, Rinecker, Müller. Besides the regular clinic, polyclinic, lectures

and courses, I had private instruction with Dr. Friedreich, now professor in Heidelberg, and Dr. Dehler, house physician at the Julius Hospital. I remained in Würzburg two years. Here I had a great deal to unlearn, owing to the genius of Virchow, the revolution produced by whom in medical science is recognized in Europe as leading to the true path towards a knowledge of disease. His cellular pathology opened new mines of knowledge for the student, and paved my way to reach the investigations laid down here. From Würzburg I went to Marburg, the university of my native country, to finish my university education, and to pass the examinations required to receive my diploma as M.D. After having gained this, I divided my time in comparative studies on the morphology of the *filum terminale*, under the guidance of Dr. Stilling, world-renowned through his microscopical discoveries in the brain and nerves, and at the "Charité" in Cassel, in practical medical observations. I may add, that, during my studies in Europe, I enjoyed all the advantages which can be had by influence or money, and which aid greatly in comprehending and digesting the enormous material now embracing a medical education. Thus prepared, I emigrated in November, 1857, to Boston, where I expected to find a larger field for me than in the small country of Hesse-Cassel. I consequently entered the Massachusetts Medical Society as a member, to which end I had to pass an examination before the censors of that body. Since 1857 I have practised in Boston with the sole interruption of one year, which I spent in Hayti, for the purpose of founding there a hospital for lung-diseases, for which inducements had been held out to me. The constant revolutions in that country thwarted my object. During my stay in Cap Haytien I had charge of the sailors' hospital, founded there by the merchants of that city. My medical career comprises an especial medical study in Europe of eight years, and a general practice in America of ten years. Previous to this treatise, I have published "Zur groeberen morphology des Filum terminale," Cassel, 1857; "Sketch of the Theory and Cure of Phthisis," Boston, 1864; which publication caused a "Critique" upon "The Boston Medical and Surgical Journal," Boston, 1864.

Those of my readers who are acquainted with Virchow's

"Cellular Pathology," will find many facts used from that celebrated author, which may strike others as entirely new.

Having complied with the wish of my publisher, in writing this preface, I hope that the attention of all my readers will be captivated more by the subject than by this introductory passport.

BOSTON, SEPTEMBER, 1867. CARL BOTH.

INTRODUCTORY REMARKS.

THE object of this treatise is to explain the formation and growth of tubercles in the lungs, which produce that most dreaded of all diseases, popularly called "*consumption*," and to impart to the reader my discovery of a radical arrest of this disease, which discovery I have practically applied with the best results during the last ten years. In the concluding pages of this work, a few cases of practical treatment are given, and the diary of one of my patients, the value of which will be especially apparent to medical practitioners.

It is the object of the organic sciences to explain the nature of what we call life. It is known that all vegetable and animal tissues are composed of cells of different structure and qualities. Each of these consists of an integument, with liquid in it. In this liquid we find one or more nuclei, each of which contains again a nucleolus, the smallest of organic bodies known to us. The human body is composed of millions of these cells; and it is impossible to bring the smallest particle of our body under the microscope without seeing that it is entirely formed of these cells, each of which is an organism in itself, which may grow or decay without interfering with the rest.

Science enables us to trace the very beginning of the human body to one only of these small cells. Being overnourished, it grows, divides itself, forms two cells, four, and so forth, until we have the human egg. This egg, brought in contact with male cells, forms the human embryo, and finally an independent organism by itself. We perceive during this process that peculiar circumstances unite for the development of cells. One is their nourishment, the other is their location. Is the

first neglected, the cell dies; according to the latter it may grow, or change its structure. We speak, therefore, of normal and abnormal development of cells.

As a nation consists of millions of single individuals, each holding a superior or an inferior position, each dying and being replaced without injury to the whole, so is our body a commonwealth of cells, each of which has its office; each may die and become replaced by another. As a statesman watches over each individual, prevents the immigration of bad persons, and tries to improve each for the benefit of the whole, so the physician should know all cells of the body, their office, and their place. He should cause their removal in case of unfitness or decay, and prevent such cells as do not fit its general structure from entering the body. As the statesman tries to find the originator of a rebellion against the welfare of his state, arrests and expels him, so the physician must find the cell or cells which have degenerated, or which are wrongly located, expel them, or, at least, try to render them harmless.

The knowledge of the structure of these cells we owe to Rudolph Virchow, of Berlin. When professor of pathological anatomy at the University of Würzburg, from 1848–57, he, in connection with Koelliker, Scherer, and others, subjected the human body to the examination on the cellular principle, and thereby created *cellular physiology* and *cellular pathology*, the greatest discoveries in medical history.

He was called to Berlin in 1856, where the physicians listened to his views and explanation of diseases with astonishment. Their hard-acquired experience, their theories and dogmas collected through a lifetime, their pathology, which had been established for hundreds of years, became obsolete through the submission of the human body to the cellular principle. In 1858, he published his "Cellular Pathology," which was speedily translated into five modern languages. But, as its use requires a long and thorough study, it was not so well received by the practical physicians as by the scholars. This is the more natural, as Virchow has not laid down a finished path, but only points out the direction to be pursued. The pupils of Virchow have to pioneer the way which practitioners can subsequently traverse. As the views and comprehensions of

our body have become clearer, the ideas respecting disease have changed. While hitherto disease had always been to physicians a dim, incomprehensible something, with certain symptoms, we now delineate any disease on the blackboard, and show and explain it. While the physicians have reduced symptoms to a system, and classified them into different diseases, and prescribed different remedies for each, so now we seek the cells which are either displaced or wrongly nourished. When we have found them, we have found the key to the treatment. We either expel the displaced or disordered cells out of the body, or we cut off their nourishment, or we incarcerate them, and thus render them harmless to the rest of the body. In these efforts, the organism itself helps us if we only assist it. The surgeon takes the knife, and boldly opens an abscess; he assists the body to expel the displaced cells, after which the organism heals the wound without further aid. If such displaced or diseased cells are in the lungs, we cannot employ this method, but must assist the organism by other means. Where the surgeon cannot use the knife, he applies pressure. This cuts off, wholly or in part, the nourishment of such cells, and arrests their further growth or degeneration. *Now we can apply pressure in the treatment of the lungs.*

It is hardly necessary to remark that all the cells composing our body live and are sustained by the food we eat: if we cut off our food, we cut off the nourishment of the cells. *I must add, that, by giving different food, we produce different effects on the cells.* The bees, for instance, produce by different food and location only, from one and the same egg, three totally different kind of bees; different in form, size, and quality. From the bees we may learn the important consequences resulting from the quality and the quantity of food; and in this study lies the whole future of medical science. We know that a hen requires lime for the shell of her eggs; and for that reason her food must contain enough of that substance, or she will lay eggs without a hard shell. We also know that our blood requires lime for calcifying displaced or degenerated cells by depositing that substance into them; and it is the problem of the physician to aid it in this task, by furnishing it with all the

lime needed for this purpose. How to get that lime into the blood I mean to show in the course of this treatise.

As my investigations are based entirely upon the latest researches in anatomy (especially histology), physiology, and animal chemistry, it was necessary to introduce as much of these sciences into this treatise, as was needed to make my ultimate conclusions clearly understood.

FORMATION OF TUBERCLES IN THE LUNGS.

The human lung is a gland which is composed of air and of blood-vessels, and which serves in the body as the organ which brings the oxygen of the air in direct contact with the blood. The vessels through which the air passes into the lungs are called bronchi: they branch out from the throat like the branches of a tree. At the end of each of the smallest bronchi we find a bunch of little vesicles, not unlike a bunch of grapes. These are the air-vesicles, or alveoles of the lungs. The lining of the air-vesicles differs from that of the bronchi, and they have a layer of pavement-epitelium, while the bronchi have a hair-epitelium. The hair-epitelium, standing with the ends of the hair-fibres towards the throat, does not allow phlegm or mucus to pass towards the lung, but towards the throat, from whence it is expelled by the act of coughing. The vessels which conduct the blood from the right heart-ventricle to the lungs, also spread out like the branches of a tree, and form a net of very fine vessels, which are called capillaries, or hair-vessels. These accompany the finer bronchi, and surround each of the air-vesicles, throughout many windings, thus making a very long passage through the lungs. The blood then collects again in larger vessels, through which it is conducted into the left heart-ventricle, from whence it is diffused throughout the body. The lungs thus represent a tree of blood-vessels with two roots, — one in the right heart-ventricle, the other in the left. Into the branches of this tree the ramifying air-tubes are lodged, as another tree with one root, the throat; and the third and fourth tree, which branch out into the lung, are two nerves, each accompanying the net of blood

and air vessels. Besides these the lungs have also lymphatic vessels and blood-vessels for their own nutrition and support. The whole of this net-work is bound together by a very fine and elastic tissue.

While the black venous blood is constantly pumped into the lungs from the right ventricle of the heart, the air is drawn in by inspiration, meets the blood, exchanges and combines oxygen with carbon, and, while the changed air leaves the lungs through expiration, the changed and purified blood is conducted into the left ventricle. This process is called respiration, and is well known by everybody: but how it is that air and blood mix, without interfering in the least with one another's course, is entirely unknown. Science has explained it as being done by diosmosis. This is, however, impossible, because diosmosis is based on the laws of different specific gravity between two liquids; and, according to these, the specific heavier blood would necessarily run into the specifically lighter air of the air-vesicles. As it is necessary to understand this point with a view to comprehend my theory of the formation of tubercles, I shall give an explanation of the matter.

Plate I. Fig. I. represents a magnified section of a piece of lung during inspiration.

Fig. II. the same during expiration.

On a comparison of the two, we notice that the space between the air-vesicles and blood-vessels is considerably larger in II. than in I. If we suppose, as we are compelled to do, that the walls of the air-vesicles are penetrable for air only, while we know that the walls of the capillaries are penetrable for the blood-liquid,* we may conclude as follows: During expiration, the enlarging space of the elastic tissue becomes filled with blood-liquid, while the air-vesicles are collapsed. During inspiration, the inhaled air, pressing back the blood-liquid into the blood-vessels, readily oxidizes the carbon to carbonic acid. The nitrogen of the air acts in this process as an extending force to the air-vesicles, the oxygen alone penetrates

* Blood is a combination of blood-liquid and blood globules or cells; the latter always remain inside the capillary vessels which they cannot leave unless the vessel be ruptured.

the walls as an oxidizing agent.* Through this constant pumping-work of the lung, not only is accomplished the combination of the oxygen in the air with the blood, but also the blood itself is propelled through the capillaries; which motion cannot be effected through the heart-pump alone. We have, therefore, in the lung, an extra capillary circulation, the same as we see it everywhere in the organism: here for oxidation and purification; in other parts for nutrition, and expulsion of waste material.

After we have thus comprehended the natural process of circulation in the lungs, we draw the logical conclusion, that, if the respiration ceases, the circulation of the blood through the capillaries must begin to slacken. We know from physiology, that, if the rapidity of circulation lessens, the blood-globules are apt to accumulate in the fine capillaries, and are liable to obstruct them. If this obstruction is not removed, the consequence will be an enlargement of the vessel directly before the obstructed place; the heart pressing the blood constantly into the lung, the obstructed capillary vessel becomes so enlarged above the obstruction, that the walls of it, being finally too thin to stand the pressure, burst, and allow blood-globules to escape into the lung-tissue. Thus they are thrown out of the general circulation, and act as foreign bodies in a tissue and place where they do not belong. See Fig. III. Being normal cells, they are transformed according to circumstances, under the laws of nutrition, and formation of cells. Thus, if they are nourished, they divide, form new cells, and create a new formation. If the nutrition is imperfect, they degenerate into fat-cells; if the nutrition is fully interrupted, they decay and shrink, forming pus, or calcify and dry up.

In this process we now find the basis for the formation of tubercles. The most important of recent theories respecting tubercles is that of Virchow. He represents the tubercles as the consequence of the abnormal growth of a binding tissue-cell; thus making a new formation, which in itself has a scanty beginning, and decays as it develops itself. It seems to me hardly possible

* The air is a mechanical mixture of 21 vol. of oxygen to 79 vol. of nitrogen.

that a cell should begin to grow in its proper place and decay at the same time. This is a process not elsewhere observed in nature. I maintain, by my theory, that the tubercle mass in the lungs originates, not with the binding tissues-cells, but *from the blood-globules which are thrown out of circulation, and lodged into the binding-tissue*. We have, therefore, nothing to do with a peculiar tubercle-principle or body, nor can we call tubercles at any time a new formation. It is certain, that, with the degeneration of the blood-cells, the surrounding cells also begin to degenerate. We find, therefore, in tubercular masses, cells of different kinds: pus-cells, shrunken-cells, fat-cells, epitel-cells, binding tissue-cells, red and white blood-cells, elastic fibres, nuclei of cells, crystals of blood-salts, fibrin coagulum, etc., each according to time, place, and circumstances.

The air-vesicles or alveoles of the lung disappear through the pressure of the foreign cells and re-absorption; in the first instance they suffer collapse, and are then finally destroyed. Figs. III. and IV.

I therefore wish to be understood as maintaining, that *tubercles in the lungs are composed of, and originate from, blood-globules which have escaped out of the general circulation, through the bursting of an obstructed capillary vessel. That this obstruction takes place where the respiration is suppressed.* From this we draw the conclusion that *tubercles can nowhere originate in the lungs, except in those parts where the respiration has been oppressed or has ceased.*

Should a blood-vessel burst, the respiration *not* having been interrupted, haemoptisis takes place: in phthisis, this latter only occurs when a vessel is corroded by putrid suppuration; does this not exist, no haemoptisis is observed.

I have tried to produce artificial tubercles in the lungs by pumping the air out of a lobe, and allowing it to remain collapsed; but I never could succeed in obstructing a bronchus without killing the animal. I used dogs for my experiments. I tried it through an aperture in the chest, being impossible with animals to try it through the throat; but the entering of air into the pleural cavity always spoiled my experiments.* I maintain, that if we pump the air from the bronchi of a

* Circumstances interrupted me in the prosecution of these experiments;

healthy lung, and allow it to remain collapsed, we should find tubercular degeneration appear in a few months. If we should obstruct one of the veins of the lungs, we would produce congestion, inflammation, and gangrene; and, if we should paralyze a portion of the plexus pulmonalis, we should cause asthmatic affections, even to the point of asthmatic suffocation. The fact that the *nervus vagus* is the same which governs the respiratory motions, and that which, at the same time, regulates the digestive motions of the stomach, furnishes the reason why bad digestion accompanies difficulties of the respiratory organs, and *vice versa*. Here we also find the cause why consumptives, although they may have a good appetite, have a very sensitive stomach, and that the least irritation of this organ produces respiratory efforts with cough. Hence the paramount importance of a careful regimen in lung-diseases. The *nervus sympathicus* regulates the circulation and nutrition of the lung; and, as the pectoral and abdominal plexus of this nerve are only different parts of the same nerve, we may easily understand how digestion and lung circulation influence each other. For the treatment of consumption, these facts are of the utmost importance.

but I intend to take them up again as soon as possible, with smaller mammals and birds. Such operations always were performed under chloroform narcosis. Though not successful so far, I believe the obstruction of one lobus can be effected by proper facilities for experimenting; and I should be glad to hear that some physician who enjoys such facilities would continue these valuable researches and report results.

THE INHERITANCE OF CONSUMPTION, AND ITS CONSANGUINITY.

The disease which is called consumption, pulmonary tuberculosis, or pulmonary phthisis, was known a long time before anatomy, physiology, and chemistry, were reduced to sciences. It is therefore natural that a great many erroneous ideas have dragged along through centuries, and have not been discarded by physicians. *One of these is the inheritance of consumption.*

Because it was observed that in certain families consumption appears from generation to generation, even to such an extent as sometimes to exterminate such families, and because it sometimes passes over one generation and makes its appearance again in the next, it was laid down as a fact, that it must be a hereditary disease. As nobody could comprehend this clearly, it was supposed that a certain principle, called consumptive or scrofulous, was contained in the blood of such persons; and, therefore, the fact was assumed to be established, that consumption was inherited and retained in the blood of such families.

Because it was likewise observed that consumption appears in persons whose ancestors never exhibited it, it was also accepted as a fact that it could originate by itself: and, as this origination could not be explained, it was thought that the disease was contagious: this was afterwards denied by some physicians, and upheld by others.

To this state of the blood, in which the scrofulous principle was hidden, and entailed upon family after family, or which originated in a single individual, the name of "discrasy" has been given by the old pathologists.

The genius of Virchow has explained and shown, first, that a "discrasy" of the blood can only exist where the impurity,

or the infecting substances, are constantly, and permanently introduced into it from a so-called "nidus," — a place where the infecting disease has its nest, and from whence the substances which infect gradually the whole of the body, are carried into the blood. Without this nidus, the blood can neither hold an infecting impurity nor is it able to produce it permanently. We have, therefore, to find this place, or nest, before we are able to comprehend the origin and nature of consumption.

To those who hold the theory of inherited phthisis, it must be a fact not easy of explanation, that the tubercular process in the lungs always begins at the apex of it; and the further fact, that, while one or more members of a family exhibit it, the others are exempt, which is often the case even when both parents had died of phthisis. If we wish to answer these questions, we are obliged to go back to the development of the lung **in the infant child, before air ever entered it.**

Before a child is born, its lungs form a solid mass, which immediately sinks in water. After birth, the child begins to make the first inspirations of air, opening the lungs. This process of opening and extending is greatly assisted by the spasmodic crying which all normal-born children exhibit. In Europe, it is customary to slap a child if it does not cry sufficiently and strong enough; for occasionally new-born infants appear to be in a kind of stupor, and inspire insufficiently. If, then, the child does not fully extend and fill all air-vesicles with air, parts of its lungs remain solid. If this is the case to any considerable extent, the child turns blue in the face when crying vehemently; and such children die generally in early life. In cases of small extent, comprising only a few bunches of air-vesicles, it would escape notice altogether. Science has given to this state the name of "atelectasis infantum." See Figs. V. and VI.

This disease, or defect, is therefore very common among delicate children, — the strong ones being enabled to cry with sufficient force to fill the lungs with air. Parents affected with phthisis, or who exhibit the so-called consumptive habitus, of course produce children less vigorous than those in robust health; and, being ignorant of the existence of atelectasis and its consequences, would be likely to rear a family thus affected.

Two months after birth, the inflation of any unopened air-vesicles becomes impossible, as, during this time, adhesion of the inner lining of the vesicles has taken place. We observe many children with the collar-bone standing high above the thorax; and this class we must regard as being affected with **partial atelectasis from early youth.**

Here we have found the nidus of that diserasy which has until now been classed under inherited consumption. So long as the child plays about in the open air, keeping the lungs under full pressure, no opportunity is given for the rapid development of these neglected — we may say morbid — parts. But as soon as business or fashion compels a sedentary life, the parts not subjected to atmospheric pressure begin to degenerate. Experience and common sense have led to the introduction of gymnastics in schools; but these do not suffice to remedy for life the consequence of neglect in earlier days. Returning to our first chapter on the formation of tubercles, we find that the difference between the formation of tubercles during life, viz., acquired consumption, and the formation of them in the so-called inherited form, is, that the air-vesicles in the first have been once extended and used, but were afterwards neglected and collapsed; while, in the second, they never were extended at all, and have remained in the state in which they were in the fœtus. It is, therefore, only a difference of time, while the causes and effects remain the same: and I lay it down as an axiom, *that tubercles in the lungs cannot be inherited; but that insufficient respiration at the time of birth lays the foundation or nidus for their formation.**

If we know that the apex of the lungs is the part lastly extended by the first inspirations of a new-born child, and only used on great exertions during life, we may readily understand *why tubercles always begin to make their appearance in the upper points, — never in the basis:* and why one child of a consumptive family, extending his lungs perfectly, may live, the

* In answer to the frequent question, whether primary tubercles originate in other parts of the body as well as in the lungs in the same manner or not, I must refer the reader to Virchow's Cellular and Spec. Pathol I.; also, "Ueber die Natur der constitutionell-syphilitischen Affectionen," Berlin, 1859. My observations, thus far, have been confined to the lungs only.

other, for reasons indicated before, not doing so, *may die of consumption;* and also *why consumption may skip one generation and appear again in the next.* If, therefore, families with consumptive tendencies assure themselves that the lungs in their newly-born children are perfectly extended, they may be satisfied that the inherited form of consumption will never appear in such children, although they may be liable to acquire it by later neglect, as would other persons under the same circumstances. For the treatment of the developed disease, it does not make much difference when the respiration ceased in the air-vesicles, — whether at birth or at a later period.

ORIGIN OF MY THEORY, AND GENERAL REMARKS THEREON.

At the time of my medical studies in Göttingen, consumption was considered a totally incurable disease. But since post-mortem examinations have become the established rule, it has been ascertained that very often the tubercular process is found healed in persons who have died from an entirely different cause. It happened, while studying under Virchow, in Würzburg, that I was present at a post-mortem examination, where the natural healing process could be seen beyond doubt: the man's death had been occasioned by an accident. This convinced us that if *Nature can and does cure consumption by her own process, it must be possible to cure it by medical treatment, if we can ascertain Nature's methods.* This natural healing process consists in the calcification of the diseased parts, so that they appear as if made of chalk, though the original cells and tissues can yet be detected by the microscope. It is evident, therefore, that, in such cases, the blood must have been able to furnish a considerable quantity of lime, to provide for the calcification of the decayed parts. Through the study of the finer structures of the lungs, it became evident to me that the cough connected with the disease was *not a symptom of it*, but rather *a remedial action* of nature to expel the diseased matter, and thus cleanse the bronchi and air-vesicles; and also, to extend the latter by pressure of air. Instead, therefore, of trying to subdue the cough, I came to the conclusion to assist this natural action, and help in this way the efforts of nature. I soon began to apply my theory in practice, and I found it to work correctly. Thus I was enabled to cure chronic bronchitis without difficulty in a shorter time than I had ever known or heard

of before. Feeling more and more convinced of the correctness of my calculations, I began to experiment with consumptive patients. I came to the conclusion that the cough in consumption was not only important as a cleansing process, but also as a means of forcing air into the lungs. I then labored under the impression that tubercles were an exudation of impurities of the blood into the air-vesicles. I began to force the air into the chest, and succeeded better; yet I did not succeed to my own complete satisfaction until I began to attend to the blood likewise. I discovered the way of introducing lime into the blood in such a way as to cause it to be deposited in the lungs, not interfering with, but supporting, the general process of nutrition. I also found means to cleanse the blood of those impurities which cause the profuse sweats and the offensive odor of the perspiration; and, lastly, by experimenting and carefully studying the chemistry of food and the effects of different varieties of food on the blood, I have succeeded in bringing my theory and treatment to such perfection, that I feel assured of being able to guarantee an unfailing success in each case where *no* actual loss of the substance of the lung has been occasioned, where no large empty cavities exist, or where the lymphatic glands of the abdomen and intestines are not affected with the diathesis.

In this country, the profession regard consumption as an incurable disease. In Europe, the most eminent writers on tuberculosis — in France, *Piorry* and *Thierceliu;* in England, *Alison* and *Churchill;* in Germany, *Canstadt*, *Niemeyer*, *Friedreich*, and others — pronounce its curability with the greatest confidence (Thierceliu even affirms the curability in all stages); but *Virchow* has demonstrated this as an unquestionable fact by means of autopsies; he has shown that tubercular deposits heal much easier than was ever anticipated; but none of these savans has established a practical method, or even a satisfactory theory on the subject.

It has always been the great object of physicians to find a specific remedy for consumption; and a great many agents have gained a reputation as such. But the results have disappointed the expectations of those interested. One of the most recently famous was *cod-liver oil*. As long as patients can digest it, this oil really seems to effect some improvement; but it soon ruins the

digestion, and, of course, the life of the patient. Cod-liver oil contains nothing which possibly could act as a specific medicine. Next to it was *alcohol* and *fusel oil*. The latter is nauseous and altogether useless. Alcohol, when first taken, seems to agree well with the sufferer: the cough becomes less troublesome, and, for a short time, the patient seems to revive. This is owing to alcohol's great affinity for oxygen; but as it readily penetrates the whole body, over-irrritates first, and afterwards relaxes the nervous system, the lymphatic glands, already in a debilitated condition, are unable to reabsorb it quickly enough, and the body becomes bloated, the blood becoming thinner and poorer. Alcohol, thus, instead of being fully converted into carbonic acid, water, and heat, forms, for want of sufficient oxygen, butyric and acetic acid, — two gross impurities, which are already found in the blood of consumptives, and the removal of which should be a great object in medical treatment. The *hypophosphites of lime*, recommended by Dr. Churchill, have been used to a great extent. The principle of this method is nearly correct: but the body is not able to absorb to advantage either phosphorus or lime in this form. It therefore failed in the expected results. All specific medicines failing, the *direct treatment of the lungs* was resorted to. This consisted in *inhalations* of medicines in the form of *vapor*, or in *finely-dispersed liquids*, of *gases*, such as oxygen, prussic acid, chloroform, ether, etc., partly to effect a cure, but principally to subdue the cough, The latter was achieved, but without producing any good result, as the patients died the quicker for it, by being prevented from throwing off the pus and mucus. The remedy mostly relied upon, or rather that plan which has retained the most confidence, is *change of climate*. It cannot be denied that many consumptives have been greatly benefited in this way, principally owing to the change of food, more exercise in pure air, and keeping the patient in better spirits. However, as soon as they return, — which they often fail to do, — they are just as bad, if not worse than before. For the sake of my own information, I have travelled through a part of Jamaica and almost the whole of Hayti. I found the air at the height of 2,000 to 3,000 feet probably the purest and most agreeable of our globe: but these regions are totally bare of comfort and

civilization, while the cities in the tropics are the more unhealthy the larger they are; and therefore no places for invalids. I went to the West Indies with the view of erecting an establishment for the cure of consumptives, but returned with the conviction that the prevailing circumstances taken altogether are too unfavorable for the success of such an enterprise.

Of late, the treatment of *subjecting the lung to a greater atmospheric pressure* has been accepted in Europe against chronic bronchitis; several institutions having been erected for this purpose, and, as I believe, with eminent success. The principle consists in having an air-tight room, into which, by means of an air-pump, the atmospheric pressure is increased *ad libitum*, and the patient is suffered to breathe therein. This comes, as will be seen, very near to my own mode of practice with the lungs: but my machine for applying pressure is the body itself, — the most perfect one existing.

I divide my treatment into three sections, each of which, being managed by itself, finally support one another in their effects: —

1. The *extension and cleansing of the lung by pressing air into it.*

2. The *introduction of lime into the blood* in sufficient quantity for the calcification of the tubercles; and the *purification of the blood by higher oxidation.*

3. The *determination* and *regulation* of a *diet* to suit the particular form and degree of disease under which the patient labors, to build up his strength, and to modify the character of his blood.

TREATMENT OF THE LUNGS.

The direct treatment of the lungs consists in pressing the air into them by natural inspiration, powerfully stimulated by certain muscular exercises, which are calculated, anatomically, to effect this object. This treatment is founded upon the following facts: If, in the case of a collapsed lung and chest, we increase the pressure of air in the lungs, that organ and the thorax will necessarily be extended; and, if this extension be effected through the action of the respiratory nerves, the air will pass gently and gradually into the smallest bronchi. The air vesicles and the obstructed bronchi will through this means be opened, and the pus and mucus contained in them will be expelled by the increased ciliary motion, by the revolving air, and by the action of the cough. At the same time the capillary circulation will be increased, diosmosis of the cells will be renewed, and many of them rescued from fatty degeneration and decay. This action is very different from that achieved by the extension effected through mechanical means, the nerves not participating in it; in this case the pressure will fall mostly on the lower and free bronchi instead of entering the upper and finer ones which first become obstructed. When air-vesicles are extended by such mechanical pressure beyond their capacity, emphysema is likely to be produced, and the obstruction increased by the mucus entering into the finer bronchi. In this way the air is prevented from passing into the collapsed air-vesicles at all. Artificial machines and pumps for extending the lungs therefore fail to produce the desired effect. The carbonic acid generated in the lungs acts as a strong irritant on the respiratory nerves. To increase the nervous action of the lung, and to produce at the same time an increased

pressure, we may resort to tension of the respiratory muscles as a pumping force on one side, and as an irritant on the respiratory nerves by reflex irritation on the other.

To demonstrate the result the following practice will be found to conduce: Let a person rest the whole of his weight on the ends of his toes and fingers in a horizontal position. He will find, on rising, that he must take larger and more forcible inspirations than were otherwise possible. By means of the forced inspirations effected in this way, we are enabled to drive air into the diseased parts of the lungs, and to extend them in consequence; by gradual increase of these forced inspirations, we are enabled to allay congestive inflammation, to restore bronchial and vesicular respiration, relieve the bronchi and air-vesicles of liquids and pus, and cause an adhesive inflammation around the decayed parts; and if the blood is in condition to furnish a sufficiency of lime, silica, and magnesia, calcification of the decayed masses will follow. Thus the lungs may become perfectly restored to use, and, in a measure, perfect again. The extent to which these exercises may be carried, and in what manner varied, requires a good deal of judgment and practical experience, and they should necessarily be practised under the guidance of a physician. It is a great mistake to suppose these exercises to be a kind of Swedish gymnastics, or movement-cure. Their object is not to increase muscular power, but to produce an irritation on the respiratory nerves, and mechanical pressure on the capillaries. The difference between the pressure obtained by the use of mechanical appliances and the method recommended is, that the former acts more like a pushing, the latter more like a drawing force; in other words, the former represents an asthmatic bronchial breathing, and the latter a normal vesicular respiration. These exercises should be carried on in a room with open windows, and the air kept as pure as possible. The result is unfailing, excepting in cases where the lungs exhibit great destruction of tissue, as in large emptied cavities, or abscesses. The muscles principally brought into play are the *pectoralis major* and *minor*, *serratus anticus major*, *serratus posticus superior*, *subclavius*, *the scaleni*, *latissimus dorsi*, *extensor dorsi communis*, etc.; and they must be brought slowly into action, not by sudden efforts,

or the effect will be entirely lost: they may even endanger the patient if carelessly practised, as, in the more advanced stages of the disease, consumptives have generally fever, and hemorrhage may be produced. They ought to be practised three times a day, and continued until the patient begins to feel fatigued. The practice is laborious, and causes an increase of coughing. It weakens the patient besides, and induces pain in the muscles brought into use. Fourteen days generally elapse before they begin to feel the good effects of it. I have never had a case under my treatment in which bleeding resulted from these exercises, although I have begun them soon after a severe hemorrhage, which has never recommenced. The results obtained by this part of my treatment are as follows: —

1. Cleansing, extension, and restoration of neglected bronchi and air-vesicles.

2. Extension and division, by means of air, of the parts infiltrated, thus arresting the process of decay.

3. Restoration of capillary circulation and of diosmosis among the cells.

4. Incapsulation of tubercles and cavernous places.

5. Increase of absorption of oxygen, and decarbonization of the blood.

TREATMENT OF THE BLOOD.

The treatment of the blood consists, *first*, in purifying it from those substances which cause the profuse perspiration, the odor of which is so offensive, and in preventing their further formation.

We divide our food into two classes, respiratory and plastic. The first is that which contains no nitrogen, and which serves to furnish the necessary heat to the body produced through oxidation, or combustion of it in the lungs by the inhaled oxygen. The second is that which does contain nitrogen, and which replaces the materials consumed by the action of the body.

If we eat and digest a greater quantity of respiratory food than we can burn in the lungs, then our glands will change and preserve the abundance of it in the form of fat for later use. But when these glands are suffering, and unable to perform

their office perfectly, they will, instead of forming fat, engender substances unfit for preservation, and unfit for combustion in the lungs. These substances are butyric acid, lactic acid, acetic acid, capril, capron, caprin acid, etc. It is the abundance of these in the blood which produces the profuse offensive perspiration; and it is their presence, which, by depriving the blood of proper decarbonization, causes irritation of the nervous system, and gives rise to the febrile symptoms which accompany consumption. To purify the blood of these substances, materials rich in oxygen must be introduced by the aid of the digestive organs. Vegetable acids, containing abundance of oxygen, are best adapted for this purpose. They promote rapid oxidation of these foreign substances, and aid their expulsion from the body in the form of carbonic-acid gas. It will be found, by observation, that all consumptive patients crave acids, generally expressing a strong appetite for pickles, vinegar, and the like, which is nothing but Nature's call for aid in its difficulties. As soon as the blood is pure, the taste rejects acids, and they have to be suspended; the fever abates, and the profuse sweats and odor disappear. By employing the precaution not to allow more respiratory food than can be taken care of through the respiration, we avoid the reproduction of these abnormal impurities of the blood.*

The treatment of the blood consists, *second*, in the introduction of *phosphorus* and *sulphur*. Having cleansed the blood, we must next direct our attention to the material necessary for the formation of pure blood. The foundation of our blood is albumen and fibrin, both of which contain a quantity of phosphorus and sulphur. If our food does not supply these ingredients to the blood, or if our digestion is too weak, our intestines not being able to absorb them from the food, then substances will be generated in our blood nearly related to albumen and fibrin, but containing no phosphorus or sulphur, imperfect substitutes, unfit for the formation of red blood-globules. These substances are leucin and tyrosin; and, in connection with them, we find ammonia, urea, and uric acid, in larger quantities than

* I employ acid. uvicum [$O^5\ H^2\ C^4$], acid. citricum [$O^{11}\ C^{12}\ H^5$], acid. malicum [$O^4\ H^2\ C^4$], in preference to others. Their effect on the renal secretions often is astonishing.

should be be present in healthy blood. A want of sulphur also prevents the excretion of a normal bile, and that of phosphorus a normal cerebral action. For the purpose of introducing these materials into the blood, it is necessary, by reason of the peculiar nature of the chemical processes in the liver, to administer them in certain organic combinations. The flesh of herbivorous animals contains enough of them, but the cooking of it renders the salts less soluble in digestion; I therefore have recourse to plants rich in sulphur, — *Brassica nigra*, *Sinapis alba*, *Cochlearia armoracia*, and *Raphanus sativus*; the cereals and leguminosæ contain abundance of phosphorus in their hulls; and mustard, horse-radish, green corn, coarse bread, &c., are craved by the palate on this account. Yet how often are they forbidden by physicians when most needed, for instance, in consumption! Eggs contain much sulphur, fish much phosphorus; but the impaired digestion of consumptives does not permit their use in most cases.

Having provided for the introduction of sulphur and phosphorus into the blood, we are, *third*, to obtain a sufficiency of *lime*, *silica*, and *magnesia*. These must be furnished to the blood in abundance, as they are indispensable, not only to digestion, but to the calcification of the tubercles and existing cavities of pus; and, the greater the quantity of these materials in the blood, the more rapidly does the process of calcification proceed. Lime alone would suffice for this process; but the deposit is more durable and permanent in combination with silica and magnesia. We find these materials abundantly in the hulls of oats, barley, wheat, and rye, and in the leguminosæ; but, in the early stages of the treatment, these cannot be readily digested. Extracts of herbs and plants known to be rich in these three substances, such as *Triticum repens*, *Achillea millefolium*, *Marrubium vulgare*, *Melilotus officinalis*, *Leontodon taraxacum*, *Galeopsis ochroleuca*, &c., serve me as a proper substitute. All these plants have been popular remedies for consumption for hundreds of years, and their reputation is undoubtedly founded on the facts above mentioned.

These mineral substances exhibited in vegetable combinations also aid in a proper secretion of bile; this being, in the process

of digestion, of paramount value, as most consumptives suffer more or less from dyspepsia. With lack of bile, animal food generally causes constipation; while a vegetable diet causes flatulency, and often diarrhœa. To help ourselves in these cases, we use ext. *aloes aquosum*, ext. *colocinthidis aq.*, ext. *centaurei*, ext. *cardui benedicti*, *phosphate of soda*, *chloride of sodium* and *potassium*, *tartarus boraxatus*, *tartarate of potash*, &c., in proportion to suit each individual case. In comparing the chemical constituents of bile with that of these substances, some resemblance is observed; and I can assert, from experience, that there is nothing in the *materia medica* which can so speedily restore a healthy action of the digestive organs.

GENERAL DIET.

The chemical constitution of the blood of consumptives differs in different subjects, as well as in different stages of the disease. Persons who have taken quantities of cod-liver oil or whiskey show an abundance of albumen in the blood, which excludes from it a sufficiency of salts, consequently formation of fibrin and blood-globules. Persons having lived on animal food show an abundance of fibrin, principally in the earlier stage of the disease, thus being inclined to congestive inflammation and hemorrhage. Those who have lived on mixed food show the best blood formula. It is, therefore, not possible to prescribe a particular regimen for each and every case. Only general rules can be given, to be variously shaped and applied as circumstances may require. I never saw two similar cases of consumption. Each has its own peculiarities, and requires a different treatment.

The general rule for the administration of food, in every case, should be the following: *to adjust the quantity given to the amount of oxygen to be absorbed.* Patients are often told to eat as much as possible, which is a gross mistake.

For *respiratory* food, I order whey, freshly made of boiled milk, from which the caseine has been separated by adding a little cream of tartar; malt-sugar, honey, fresh butter, gum arabic, all vegetable oils and fruit-juices; in the spring and summer, milk, after it has become thick by the formation of

lactic acid. For *plastic* food, I give, when the digestion is very bad, Liebig's extract of meat, freshly made every day. Raw beef, chopped fine, properly seasoned, and given in the form of a salad, is excellent. Beef roasted or boiled is less digestible; the fibrin and albumen becoming coagulated, and the blood salts less soluble. When the digestion is good, beef, mutton, game, and fresh fish, are the best articles of food. The bread should be made of rye-meal and corn-flour, or of rye-meal and wheat-flour (not sifted too finely), and should be well kneaded, thoroughly raised by yeast, and well baked. Sago, cracked wheat, farina, rice, corn and oat meal, apple-sauce, tomatoes, and all kinds of fresh and acid fruits, may also be given as the case requires it. At the commencement of the treatment, the diet must be strictly confined to these articles.

Potatoes, cabbage, and similar vegetables, squash, cake, pies, candy, coffee, tea, chocolate, cocoa, beans, peas, pickles, puddings, ice-creams, peppers, sauces, salt fish or meat, sausages, ham, smoked fish, almonds, nuts, bananas, raisins, wine, beer, alcohol or stimulants of any kind, rancid butter, lard, cheese, animal oil, &c., must be totally forbidden.

GENERAL REMARKS.

The treatment above indicated shows the same effect in every climate: it will produce the same result in winter as in summer. Rainy, foggy weather, strong winds, of course, are unfavorable for patients, and a southern climate would be preferable; however, the equal warmth of the south makes people less energetic, and this about balances the less favorable weather north.

A patient requires two rooms: these should be maintained at an equal temperature of from 68° to 75° Fahrenheit, accessible to sunlight, with a number of growing (not blooming) plants; the bed-room of the same temperature as the day-room. Once or twice a week, sometimes daily, a bath should be taken, and the patient well rubbed afterwards. This may be salt water, or a bath of malt, or of young fir-branches, as the case may require it. The food should be varied every day as

much as possible. The patient should avoid walking or riding against the wind, this tending to prevent free respiration, and to excite unnecessary cough; unless the weather should be very inclement, he must take out-door exercise freely every day, with the caution to guard against congestion of the lungs by too violent exercise, or giving way to fits of passion. The clothing may be the same as usual.*

In regard to mental occupation, a patient should give his full attention to the treatment for from one to three months; but, as soon as his case allows it, it is well to occupy his mind with some light business, because it will help to prevent languor, and tend to increase his nervous strength and energy.

In the beginning, the treatment often discourages patients, because they feel pain around the shoulders and back, and they cough more. But, after an interval of from ten to twenty days, they begin to feel better: the respiration becomes more free, the pulse falls, and their appetite and digestion become natural. With these symptoms, the patient regains courage; and I have often found as much difficulty with the convalescent after this period as before it; the depression of spirits giving way to an undue confidence, which results in carelessness, and inattention to the diet and exercises.

* The wearing of corsets has been objected to by many writers, as a cause of consumption. This can only apply to a badly-made and too tightly-laced article. A well-made corset, reasonably worn, not only supports the dresses, and gives aid in wearing them, but it benefits the female form in general, without interfering in the act of respiration. The respiration of the woman is pectoral, while that of the man is abdominal; and for the latter, therefore, the wearing of a corset would be injurious.

CASES FOR ILLUSTRATION.

I. Mr. W——, a German machinist, thirty-eight years of age, consulted me in 1859. He was unfit for work when I saw him; had crepitation in both points of the lung, with dull percussion; suffered from varices. His case was given up by two physicians. He was under my treatment seven months; has never since stopped working; appears of delicate constitution, but enjoys his life better than ever before.

II. Mr. Lay, artist, Boston, born in Germany, consulted me in 1858. Having participated in the revolution in Baden, he emigrated to this country. He had had a cough for a number of years. When here, his cough became worse, and the treatment of several physicians proved unsuccessful. I found both points — principally the right one — filled with tubercular deposit; no large cavities, if any. He several times expectorated blood; his sputa showed elastic fibres under the microscope; likewise pus-cells, epitel-cells, and débris of such. His health and strength began to fail gradually. After eleven months under my treatment, Mr. Lay had recovered perfectly: however, the percussion of the right apex was duller than it should be; this was owing to the lime-deposit which was thrown into it. He remained perfectly well until the spring of 1864, when there appeared some slight crepitation again in the right apex. He renewed treatment, and the difficulty soon subsided. In the winter of 1866–1867, he had a slight affection of cough, which soon subsided, under brief treatment. Mr. Lay was examined by Dr. Groux, of New York, last winter, who seemed to be much astonished to find so peculiar a percussion in so healthy a man. The percussion under the right clavicula is dull to-day; but there is no crepitation. Mr.

Lay has no cough at present; is very strong; can walk and run with any one; and there is no reason why he should not reach as old an age as persons who never knew what disease was.

III. Mr. B——, mechanic, born in Sweden, consulted me in 1860 respecting his chest. Had been doctored for some time; was unfit for work when I saw him. There was a noticeable difference in percussion; strong bronchial respiration, with crepitation. Putrid smell of breath. Had been given up by his physician. He required six months' treatment, when he was entirely cured. Has since returned to Sweden.

IV. Mr. S——, architect, twenty-two years of age, born in Boston, came under my treatment for cough of long standing. Mother had died of consumption. He recovered fully in four weeks.

V. Mr. N. P. Merritt, merchant of Boston, consulted me in 1861, for curiosity sake, as he said. He was in a pitiful condition. Had spent the last five years in vain attempts to recover his health. Had been under treatment of Dr. Bowditch of Boston, Drs. Green and Flint of New York, besides a great many other physicians. He had been in Mexico, Havana, Nassau, New Orleans, and the West, without any good result. "I have tried every thing, and I wish to try your treatment," he said. When I explained it to him, he smiled, considering the recovery impossible. His pulse was over 130; had severe night-sweats; coughed day and night; sputa of bad character, often mixed with blood. Had been sick for a period of ten years. Age forty-five. Could not digest, and appeared a mere skeleton. The color of his face was bluish-white, with the red spot on the cheeks. I myself scarcely believed him to be a case of possible recovery. He could not speak ten words without being exhausted. In January, 1861, he began the treatment. In June, we were together at Rye Beach, N.H., after he had already made a journey. In January of 1862, he started a new business in Devonshire Street, under the firm of Merritt, Parkhurst, & Co. He was then in such a state as to walk, run up stairs, strong and healthy looking, and he began to doubt he ever had consumption. He had yet an occasional light cough, and his chest was not in such condition as I should have wished; but he said he was as well as he wished

to be, and suspended treatment. I did not see him again until the fall of 1863. I noticed that he was not in as good a condition as when I previously saw him. But he remarked that he was very successful in business, and had no time to attend to his health at present. He added, "If I had had consumption, I could not have recovered: it must have been a case of bad dyspepsia." Upon this I left him. In February, 1864, I was sent for because he was very sick. When I saw him, he offered me a great sum of money if I could help him up once more. "I will never neglect myself again," he said. After eating a heavy dinner on Thanksgiving Day, he was taken with diarrhœa, which could not be arrested during the three following months. Dr. Reed of Boston had been his attending physician. He was so weak, that he could walk across the room but with great difficulty; he coughed, and raised thick putrid masses of pus. I gave him the juice of twenty lemons to drink, which arrested his diarrhœa in a very short time, discharging from his intestines a large quantity of tubercles, with portions of mucous membrane and mucus. He was, however, too much reduced to recover; and he died twenty-two days afterwards. The autopsy showed about fifteen caverns in his lungs, which contained a most offensive pus, and which were perfectly incapsulated. Tubercles all calcified. Nobody who sees his lungs (parts of which I have in my possession) would believe that a man could live two years with these lungs, and not even feel how sick he had been. The lymphatic glands were badly decayed during the acute process which the disease had made in his abdomen. The lungs showed no acute affection at all; the putrid expectoration came from one cavity, which had broken during his last sickness.

This patient owed every day of his life, since 1861, and all the money he made, to my theory and treatment: he could not thus have lived three months without it. The cure of his lungs was so effectual, that, had he not entertained the foolish idea of dyspepsia, he might have been alive, and become an old man, with all his tubercles and cavities. See plate II. When he comprehended the real state of things, he regretted bitterly that he had not continued my treatment long enough for a

perfect cure, or had not resumed it in the beginning of his returning sickness.

VI. Mrs. P——, born in Boston, twenty-three years of age, no children, consulted me in 1862, for a cough of about two years' standing. Had hemorrhage several times; no fever; respiratory murmur strong bronchial; percussion perceptibly dull under clavicular bones; loss of flesh and strength. Lost her father by consumption. In not quite three months she was totally restored to health, and was so in 1865 when I saw her last. She now resides in New York.

VII. Mrs. P—— of Petersham, Mass., consulted me as a consumptive patient in 1861. Had bad cough, with occasional bleeding, for several years; several members of her family having died of consumption. She had tuberculosis, — recovered perfectly, and was well in 1864. Subsequently she removed West, and I have not heard of her again.

VIII. Miss Ellen B—— of Petersham, Mass., consulted me, in 1862, for hemorrhage and cough of one year's standing. She had considerable crepitations, with slightly dull percussion. Saw her but twice during a period of eight weeks, when she considered herself well, and appeared so. She was well in 1865, since which time I have not heard from her.

IX. Mr. St——, merchant in Franklin Street, Boston, consulted me in 1862. About twenty-six years of age. Had had hemorrhage of the lungs, with cough, losing appetite, flesh, and strength, and was considered a victim of consumption by his family. By advice of Dr. Bowditch, he had taken fusel oil, and had been living at the Isle of Shoals, without any benefit. I found no tubercles, prescribed for him, ordered his diet, dismissed him as well, in three weeks, and he is so to this day.

X. Mrs. Ch—— of Boston, some twenty years of age, a lady belonging to a family which is famous in Boston and Woburn for perishing of consumption; no children; had suffered from a hacking cough for several years. I was called to see her in April, 1862. In July, 1862, she had lost her cough, and has not had it since. A relative physician of hers told me, lately, that he was positive she had tubercles in the lungs.

XI. Mr. P——, belonging to a consumptive family, married, consulted me in 1862, for what he called old-fashioned con-

sumption. He had very little cough, but was quite feeble; had occasional night-sweats and fever. Percussion was slightly dull on both points. Respiratory murmur, hardly noticeable in the points, seemed changeable at different times. No hemorrhage, but very offensive breath. After four months' treatment, the percussion was more sonorous, respiratory murmur normal; was otherwise perfectly well, when I dismissed him as cured. Have not seen him since.

XII. Mr. W——, merchant, of Boston, consulted me in 1862, for a dry cough of seven years' standing. Forty-six years of age. He was losing flesh gradually, and felt quite anxious about himself, as several members of his family had died of consumption. Had considerable crepitation, with dull percussion on right point. After four months' treatment, he considered himself well, and was so in 1865, when I saw him last. His cough had left him; crepitation had disappeared, but percussion seemed to be the same.

XIII. Miss L—— of Boston, twenty-five years of age, consulted me for cough and hemorrhage of the lungs in 1863. Mother and sister had died of consumption. Had been under homœopathic treatment, and was considered a serious case. Percussion slightly dull, with crepitation on left point; right point bronchial respiratory murmur. She was perfectly well after three months, and is so to-day.

XIV. Mademoiselle Chassaign, daughter of the Maire of Jeremie, Hayti, seventeen years of age, an almost white Creoless, had strong tubercular infiltration in both of her lungs. Her pulse averaged 130; night-sweats; had lost her catamenia for over one year; was very weak, and her parents expected to lose her soon. Her brother died of consumption when I arrived there in 1865. She was under my treatment about three months, when her pulse was below 100, her cough a good deal better, her general health good, and gaining strength every week. I then was obliged to leave the place. Heard from her in July, 1867, when she was as well as when I left her. Creoles, when attacked with consumption, seldom live over one year from the beginning of the disease.

XV. Mad. Serrie, twenty-seven years of age, daughter of a light Creoless and a Frenchman, was affected with cough; chest

very narrow; severe dyspepsia; evening fever; very nervous temperament: had crepitation in the chest; percussion dull; had changed climate without benefit. I left her entirely well after a treatment of not quite four months. Have not heard from her since.

XVI. Mr. R——, nineteen years of age, clerk, of Boston, consulted me for bleeding of the lungs in 1864. Had considerable crepitation in left upper point; resonance was fair; breathing short; cough for considerable time. Was dismissed, as well, after two months' treatment.

XVII. Mrs. W——, a lady of forty-seven, widow, consulted me for a chronic cough of ten years' standing. She had taken quantities of medicine, and was much reduced when I saw her. She had lately begun to expectorate profusely, and lost all appetite. Had taken cod-liver oil, which ruined her digestion completely. There was considerable bronchial rattling over the whole chest, but no dulness of percussion. She had occasional fever, and was considered in the last stages of consumption. However, I found that she had only chronic bronchitis. Recovered fully after seven months' treatment. I have had several cases of this kind, which all recovered after different periods of treatment: I omit to mention these here, to avoid unnecessary repetition.

XVIII. Mr. B——, unmarried, clerk, descending from a consumptive family, both parents having died of phthisis, consulted me for a chronic cough in 1860. His lungs were very little developed, respiration imperfect, and the upper points of low resonance. He has been under my observation for several years; his chest has much improved; cough has totally disappeared, and he is able to trot a mile without great exertion. He is one case of inherited phthisis, as explained in the treatise, parts of his lungs having never been extended.

All these cases were pronounced by their respective medical advisers as tubercular consumption and incurable; cases of recent dates, or only of the throat, I must omit here. The only cases which I lost under my treatment (5 in all), were such the diagnosis of which showed empty cavities of such size in the lungs that recovery was a matter of impossibility. I took up these cases without hope, merely to satisfy the en-

treaties of friends. But many that I have examined, most of them lighter cases than any of the above-mentioned, and who wanted confidence to undergo my treatment, have died since under the best medical attendance to be had here or in Europe. I shall now mention a few cases which have been under my treatment since my return from the West Indies, and which may illustrate the effects of the same better than those above mentioned.

XIX. Mr. W. S. Craibe, born in South Boston, some twenty years of age. He had occupied the position of clerk in the St. Denis Hotel in New York, when he began to feel sick with cough in the winter of 1865. He was last attended by Dr. Willard Parker of New York, who diagnosed acute tuberculosis of the lungs; and, by his advice, the patient was brought home to South Boston by his brother in a supposed dying condition. He was in South Boston under the attendance of his family physician, who had him examined by Dr. Calvin Ellis of Boston. Dr. Ellis confirmed the diangosis of Dr. Parker, and the case was considered a hopeless one. Against the advice of his family doctor, Mr. Craibe came under my treatment on the 22d day of December, 1866. I promised to send him back to New York in such a condition as to be able to attend to his business again, after a treatment of three months. On the 2d day of April, 1867, I allowed him to return to New York. He and his friends there were under the impression that he could not have had tuberculosis at all. Mr. Craibe went back to Dr. W. Parker, and also visited Dr. Krakowitzer, upon my request. Both gentlemen had the kindness to examine him, and both maintained the same opinion as to his having tuberculosis. This summer he has occupied the position as clerk in Russell's St. Louis Hotel, in Quebec; and, although his mode of living is not quite as I should wish it, there is a sure prospect of having him entirely cured this fall, when he will return to Boston. Mr. Craibe was examined by Dr. Marsden in Quebec, who strongly advised him to continue my treatment, and who told him that his lungs were healing quite rapidly.*

XX. Miss Lizzy Horgan, residing on Eighth Street, South Boston, a pupil of the Academy of Notre Dame in Berkeley Street,

* Has returned almost entirely well; he looks health itself, has married since, and can be found in the St. Denis Hotel in New York.

Boston, had been under attendance of Dr. Bowditch of Boston. She fell sick with an acute attack of tuberculosis on the 1st of January, 1867, and was attended by Dr. Ferguson of South Boston. He gave her case up. Dr. Calvin Ellis was called, who also, after short treatment, said she could not possibly live two weeks longer. I was induced to see her; and, although there was not the slightest hope of recovery, I tried whether I could produce some effect on her with my treatment. I saw her on the 13th day of March. She could speak but with difficulty; had over forty respirations per minute; one hundred and forty pulse when lying down. Her digestion was entirely out of order; any thing she ate made her sick: she coughed constantly; had severe night-sweats; blue lips, and a deadly color in the face; percussion was dull over the whole chest. Auscultation showed on different places all the crepitation, rattling, and squeaking that can possibly be observed in the last stages of pulmonary phthisis. I hesitated to take the case into my hands because she was likely to die at any moment. Patient was unable to leave the room on account of total weakness and exhaustion. The following is her diary: —

Saturday, *March* 16. — Pulse 132. Took a dessert spoonful of medicine [extracts with phosphate of soda]; good night's rest, with the exception of some coughing.

Sunday, 17. — Cough on awakening, and raised phlegm of a greenish color. For breakfast a saucer of sago, one cup of rye-coffee, with toast. Pulse from 120 to 124. At 11, A.M., took four lemons, which caused a severe griping. Dinner: roast beef and currant-jelly, but ate very little. Tried the exercises three times without difficulty. Supper: beef-salad, toast, and lemonade. Pulse at 6, P.M., 120. Cough during the day considerable, but raised very little phlegm, which looked more natural. Is very well with the exception of her breathing, which is very short.

Monday, 18. — Pulse 108. Good night's rest, quite smart, but troubled with the cough. Two lemons without any trouble. No appetite for dinner. Supper: sardines, bread and butter, with lemonade. Pulse 102.

Tuesday, 19. — Good night's rest. Pulse 102. Very well and quite smart. Breakfast: oatmeal and sago, with rye-coffee,

three lemons without any trouble. Dinner: beefsteak and tomatoes; good appetite. Exercise five or six times very well. Supper: sardines, bread and currant-jelly, with a very good appetite. Very well, but troubled with a moving pain in left side.

Wednesday, 20. — Good night's rest, but severe coughing. Pulse 102. Breakfast: farina, three lemons. Exercises very well. Raised considerable phlegm of a greenish color. Bathed in salt water, which caused the skin to be irritated. Dinner: mutton, with apple-sauce; good appetite. Very well, but a sharp pain under left shoulder.

Thursday, 21. — Pulse 114. Breakfast: sago, etc. Exercise. At 11, A.M. had a change, and was quite sick with vomiting. No lemons; no dinner. Felt somewhat better at 5, P.M. Supper: lemonade, tomatoes and toast; good appetite. Pulse 126.

Friday, 22. — Did not sleep well. Pulse 108. Breakfast; oat-meal and coffee, three lemons. Exercises very well, and made her cough, and raise considerable phlegm. Supper: sardines. Pulse 108. Very well, with the exception of a slight pain in left side.

Saturday, 23. — Slept very well. Pulse 108. Farina. Dinner: beef; good appetite, three lemons. Exercises very well; coughed and raised phlegm. Supper: tomatoes, bread and lemonade, with good appetite; but troubled every night with a pain and swelling in her throat, which causes her to speak very hoarse.

Sunday, 24. — Very well. Pulse 102. Bath in salt water. Exercise very well. Went out on the sidewalk for ten minutes, and was quite smart. Three lemons. Raise much phlegm; good appetite. Pulse 102.

Monday, 25. — Good night's rest, quite well. Pulse 102.

Tuesday, 26. — Good night's rest, quite well. Pulse 102. At 10, P.M., taken with bleeding, which lasted fifteen minutes. Took medicine and lemons.

Wednesday, 27. — Very well all day, bowels regular. Pulse 102.

Thursday, 28. — Feel well until noon; felt heavy, and kept her bed in the afternoon. Lemons and medicine. Pulse 102.

Friday, 29. — Very well all day, staid in, made exercise; a slight headache towards night. Pulse 102.

Saturday, 30. — Well all day. Out morning and afternoon. Slight pain in side. Made exercises, which come easier at every trial. Pulse 102.

Sunday, 31. — Very well all day, quite smart; out morning and afternoon. Slight headache towards night. Salt-water bath. Pain in side. Pulse 102. Bowels regular.

Monday, *April* 1. — Got up feeling quite smart. Staid in all day on account of weather. Pulse 96.

Tuesday, 2. — Very well all day, went out. Pain in side, slight headache. Pulse 96.

Wednesday, 3. — Very well all day. Pain in side. Pulse 96.

Thursday, 4. — Quite smart. Pulse 90.

Friday, 5. — Quite smart. Pulse 90.

Saturday, 6. — Quite smart. Troubled with heaviness in chest towards night. Pulse 96.

Sunday, 7. — Quite smart. Walked from Eighth Street to Broadway ($\frac{1}{2}$ mile); still troubled with heaviness on the chest, and coughing, which weaken her. Her weight is ninety-three and a half pounds. Pulse 90.

Monday, 8. — Very well. Pulse 90.

Tuesday, 9. — Very well. Pulse 90. Went out three times.

Wednesday, 10. — Very well. Pulse 90.

Thursday, 11. — Very well. Pulse 90. Applied leeches to avoid bleeding.

Friday, 12. — Sick all day.

Saturday, 13. — Sick all day. About 4, A.M., took the heavy feeling. At 2, P.M., took the bleeding, which continued up to 2, A.M.

Sunday, 14. — Went out. Took Acid. Halleri. four times. Very weak. Pulse 102.

Monday, 15. — Went out. Took Acid. Halleri. twice. Cough towards night without blood. Pulse 90.

Tuesday, 16. — Staid in on account of rain.

Wednesday, 17. — " " " Coughed considerably during night. Took tea (of Rad. Graminis), as ordered. Pulse 96.

Thursday, 18. — Staid in all day on account of high winds. Raised a little blood. Pulse 96.

Friday, 19. — Very well. Pulse 90.

Saturday, 20. — Very well. Pulse 90.
Sunday, 21. — " " "
Monday, 22. — " " "
Tuesday, 23. — " " "
Wednesday, 24. — " " "
Thursday, 25. — " " "
Friday, 26. — " " "
Saturday, 27. — Did not feel well. Pulse 90.
Sunday, 28. — " " "
Monday, 29. — Feel pretty well. Pain in side. Pulse 90.
Tuesday, 30. — Well all day. Feel very cold.
Wednesday, *May* 1. — Well, all but the coldness.
Thursday, 2. — Feel very cold.
Friday, 3. — " " Pulse 90.
Saturday, 4. — Well all day, but very cold. Pulse 90.
Sunday, 5. — Well up to 12½, A.M. Got pains all over her. Pulse 90.
Monday, 6. — Not well. Spit blood three times. Took drops as directed. No rest in night until 3½, A.M., when she went to sleep; coughed all night. Pulse 90.
Tuesday, 7. — Not well; troubled with her head. Pulse 90.
Wednesday, 8. — Went out. Had night sweats. Very weak. Pulse 90.
Thursday, 9. — Not well. Went out. Pulse 90.
Friday, 10. — Had night-sweats. Could not go out on account of rain. Pulse 90.
Saturday, 11. — Coughed considerable. Pulse 90.
Sunday, 12. — Went out. Did not feel well. Pulse 90.
Monday, 13. — Went to the city for the first time. Pulse 90.
Wednesday, 15. — " " Did not feel well. Pulse 90.
Thursday, 16. — Not well; very weak. Went out. Troubled in the morning with a fit of heavy coughing and vomiting.
Friday, 17, *and* 18. — The same. Too weak to walk.
Sunday, 19, *and* 20. — Very weak. It was ascertained that the patient had by mistake taken a wrong medicine, containing extr. of Belladonna.
Tuesday, 21. — A good deal better. Pulse 90.
Wednesday, 22. — Very well, but heavy coughing with sore-

ness in chest. Took a mixture of olive oil with yellow of an egg and honey. Pulse 90.

Thursday, 23. — Well all day. Drank Selters water. Very smart. Pulse 90.

Friday, 24, *to* 29. — Very well. On the 29th she walked three miles without fatigue.

Thursday, 30. — Attended a concert. Very well. Pulse 90.

Sunday, *June* 2, *to* 4. — Very well. A severe soreness in her stomach. Omit oil and eggs.

Sunday, 16. — Very well. Made exercises well. Went out. Pulse 84.

Monday, 17, *to* 20. — Very well. Pulse 84.

Friday, 21. — Headache. Had night-sweats and the heavy breathing.

Saturday, 22. — Had night-sweats. Pulse 90.

Sunday, 23. — Quite smart. No lemons, but strawberries. Pulse 90.

Monday, 24. — Quite smart. Some heavy breathing. Pulse 84.

Wednesday, 26. — Very well. Pulse 84.

Thursday, 27. — Not well; troubled with vomiting caused by milk. Head and side ache. Pulse 84.

Friday, 28. — A slight pain in her throat. Night-sweats; and coughing hurts very much. Pulse 84.

Saturday, 29. — Very well.

Monday, *July* 1. — Not very well: complaining of cough distressing her, and heavy breathing. Pulse 90.

Tuesday, 2. — Not well. Very weak. Night-sweats. Not able to walk.

Wednesday, 3, *to Thursday*, 11. — Very sick. Sore throat; very sore stomach; coughs very bad; great pain in stomach; night-sweats and heavy breathing. Pulse 102.

Friday, 12. — A good deal better. Pulse 96.

Monday, 15. — Not very well. Pulse 90. Bowels out of order.

Tuesday, 16. — Very weak. No appetite. Pulse 102. Heavy breathing. Ordered strict diet again.

Wednesday, 17. — A little better. No appetite. Bowels loose. Pulse 96.

Thursday, 18. — A little better. Ache in her right side. Pulse 96.

Saturday, 20. — Ache in her side still. Pulse 96.

Monday, 22. — Very sick. Sore throat.

Tuesday, 23. — Throat troubles her very much. Sleep not good. Night-sweats.

Wednesday, 24. — Not able to get up. No appetite. Pulse 100. No sleep.

Thursday, 25. — A little better; only her throat bad yet.

Friday, 26. — Very weak. Troubled with her throat. No sleep. Night-sweats. Dysentery very bad; and not able to go out.

Saturday, 27. — Somewhat better; sore throat.

Sunday, 28. — Came to my office. Dr. Langmaid, of Boston, had the kindness to examine her with me. The two lower lobes of her right lung were free of crepitation; also the lower part of the left lung was better. The points yet indicated crepitation and dulness, which had almost disappeared in the lower lobes. She could walk and speak freely; and, although being yet quite sick, there was positive evidence of a remarkable improvement.

Monday, 29. — Pretty well. Pulse 96.

Tuesday, 30. — " "

Wednesday, 31. — Very well.

Aug. 20. — Very well, with the exception of hoarseness in her throat.

Through the patient's neglect I have had no report since. Saw her Sept. 10th. Had had an attack of dysentery, in consequence of carelessly eating peaches, which has weakened her somewhat. Patient is inclined to remissness in her diet, which is generally the cause of retrogression. Unfortunately she is not in such circumstances as I would wish: however, I am in hopes she will entirely recover in spite of adverse circumstances. On the 15th. Miss H —— went to the city twice; also on the 16th, and is quite smart.

This case is one of extreme difficulty; and it would have been unreasonable in the judgment of any living physician to think of the possibility of even a partial recovery when I saw her in March. The decided effect of the treatment could not be denied by the greatest sceptic, even without considering the

great difficulties working against me from accidental circumstances.

To give the reader an idea of the effect of my nutritive theories, I shall relate a case which may illustrate this better than a consumptive one.

XXI. Mrs. Marshall, residing at 1461 Washington Street, Boston, consulted me for her son, twelve years of age. He had been sick for several years. Had been attended by Dr. Allen, of Roxbury, who had despaired of his recovery. The boy had then been in the country, but without any permanent effect. Was afterwards under treatment of Dr. Reed, of Boston, who also declared the boy incurable. His mother had him examined also by other eminent physicians, likewise at the city hospital. His mother and relations thought he had consumption: some physician having spoken about tubercles in brain and spine. He seemed to be paralyzed in the lower extremities: livid complexion; had a hectic cough; complained of pain in his back and abdomen; had no appetite nor could he digest any food; sleep irregular and without recreation for the body; pulse variable and feverish, weak; muscles and skin lax, the former hardly visible; the whole frame seemed to be in a state of dissolution. He had been taking bromide of potassium, iron, and iodine, freely, without any benefit. On examination, I could not detect any organic disease; found the blood to be very poor, of red globules. I ordered his diet, and prescribed for him some of the extracts with phosphate of soda; I saw him first on Feb. 13th, 1867; and, on the 5th day of March, he walked to my office (about two miles), being entirely well. He is now fat and strong. I could mention many similar cases, but, as they do not belong here, I omit doing so.

I have at this moment, besides those mentioned, under treatment, ten cases of pulmonary phthisis between the ages of nineteen and thirty-two, which are all of marked character, and given up by the best medical authorities of Boston; all of these are getting better. In only two cases my best attempts have failed, both showing tuberculous degeneration of the abdominal lymphatic glands.

As may be seen from the cases stated above, I have not lost a single patient whose bowels had not been affected with the

disease. When this is the case, a cure is not possible for anatomical reasons. I believe that by the method described by me every tubercular affection of the lung can be arrested without fail, only there must not be large open caverns. Where they exist an equal pressure of the air into the lung is impossible, and an arrest therefore very improbable.

In reviewing these cases, it should be remembered that I have found, in most of them, great difficulties in arranging such diet as was necessary, which sometimes was almost impossible to overcome. This is partly owing to the circumstances of the patients, partly to the bad cookery generally prevalent in Boston; and, partly to the fact that I am often hindered in arranging things as they ought to be, because the relations or attendants of a patient cannot comprehend the paramount importance of diet. The consequence is, that they only too often make additions to my diet, which I find out afterwards by irregularities in the digestion of the patient. This is a great drawback in every respect.

I hope soon to be able to establish an institute for the cure of phthisis. This would not only enable me to secure success with greater certainty in all cases, but also to effect a cure in considerable less time than is possible in private practice, even under favorable circumstances.

PLATE I.

Figure I. Schematical view of a piece of lung under the microscope during inspiration, showing the extension of the air-vesicles. a, air-vesicles; b, capillaries; c, elastic tissue of the lung.

II. The same during expiration; air-vesicles being collapsed as in normal respiration.

III. Through neglect of respiration, the capillary vessels have become obstructed and enlarged; one having burst by d, allowing blood-globules to become lodged in the elastic tissue.

IV. Through pressure of blood and resorption, the air-vesicles have totally disappeared; also some branches of capillaries; while others are enlarged and ready to burst. d shows the bursting of a capillary vessel, and escape of blood into the tissue; at f, we see the consequences thereof, — destruction of air-vesicles, of capillaries, and of tissue, — tubercle formation.

V. Schematical microscopic view of lung of an infant in which the air-vesicles have been fully extended.

VI. View in which the air-vesicles in one place have never been extended at all. — atelectasis; the nidus for the later formation of tubercular diathesis. a, bronchi; b, capillary; c, elastic tissue; d, air-vesicles; f, not extended air vesicles.

PLATE II.

Figure I. Point of the left lower lobus of the lung taken from case No. V., showing the laid-open cavities which were filled with thick pus. The tissue is solid and has suffered fatty degeneration. a, cavities or caverns; b, cicatrization; c, capsula around the cavities, preventing the escape of pus or gases; d, blood-pigment left from the inflammatory process which existed here before.

II. Piece of the left upper lobus, parts of which have been regained for respiration by the treatment, appearing red. a, cavity with capsula.

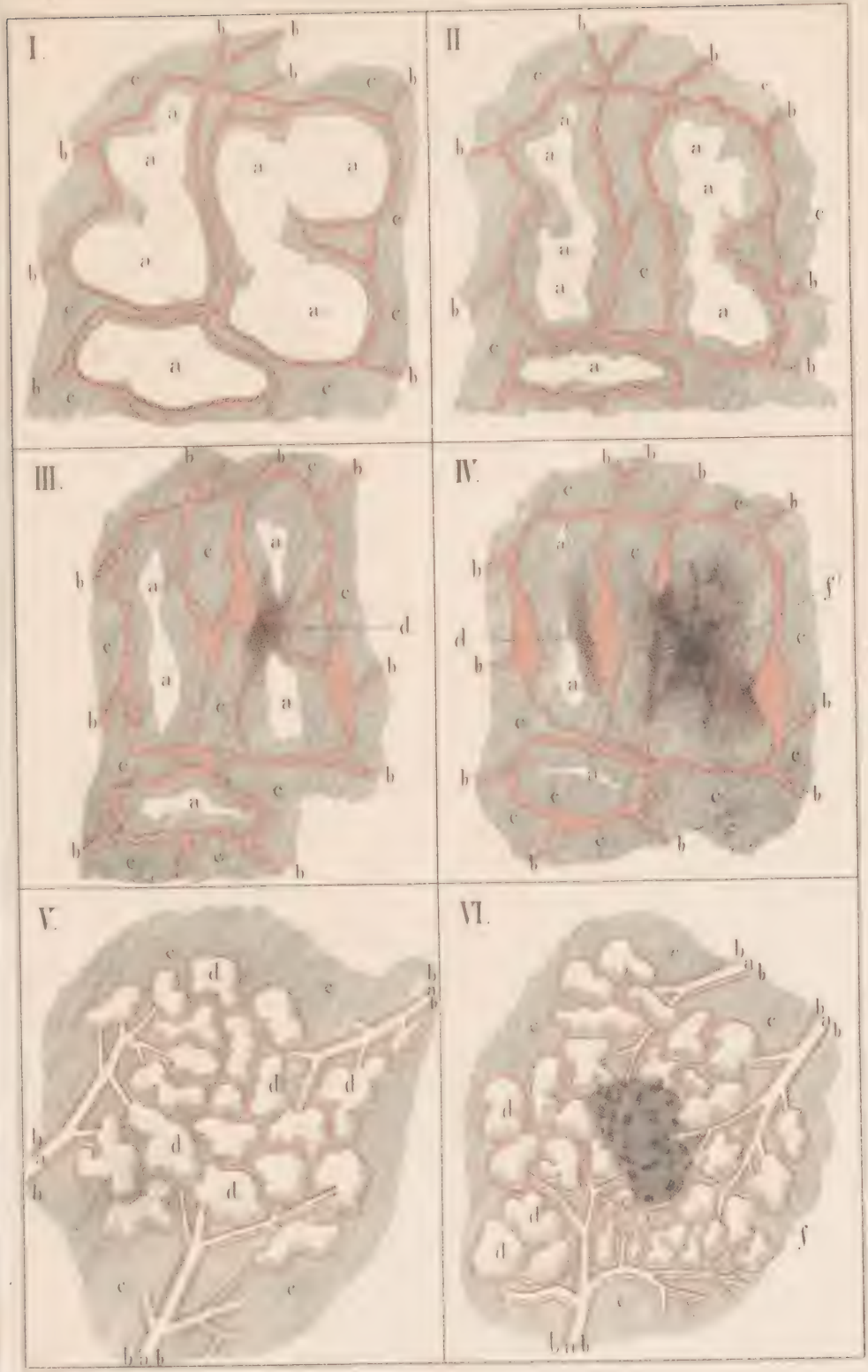
III. Piece of right lower lobus, the best one in this thorax, showing two calcified and perfectly-healed tubercles on section, a third one unopened. a, cut through tubercles; b, unopened tubercle; c, the lung-tissue which is not degenerated.

IV. Microscopic view of a section of Figure II., marked X, showing the beginning of a tubercle, arrested by the treatment. The yellow cells are fatty degenerated, the gray ones are pus-cells. Magnitude, 300.

V. Microscopic view of tubercle marked á, in Figure III. In making the section the lime deposit broke. This præparat shows the binding tissue which has formed the capsula around the tubercle. Magnitude, 300.

VI. Microscopic view of the pigmented part of Figure I., showing an abundance of pus-cells: between them the pigment. Magnitude, 300.

Figures I., II., and III. have been painted by Mr. Natter. Figures IV., V., and VI., by Mr. Lotz, from the microscope.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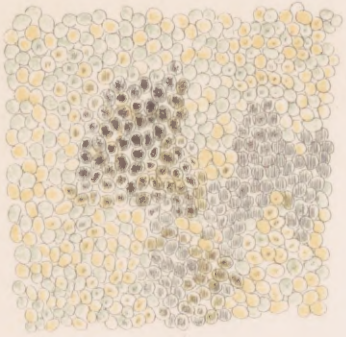

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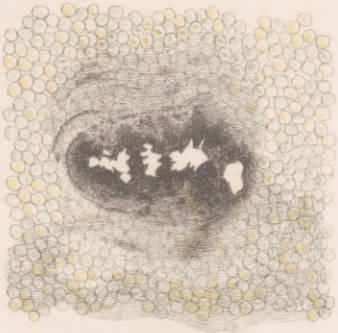

VI.